

# PATENT SPECIFICATION

806,999



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## COMPLETE SPECIFICATION

### Improvements in or relating to Apparatus for Differentially Tempering Glass Sheets.

We, SOCIETE ANONYME DES MANUFACTURES DES GLACES ET PRODUITS CHIMIQUES DE SAINT-GOBAIN, CHAUNY & CIREY, a body corporate organised under the laws of the French Republic of 1 bis Place des Saus-saies, Paris 8e, France, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to apparatus for the differential tempering of glass sheets. It is known to temper glass sheets uniformly by the use of a blowing chest of the kind (hereinafter referred to as the kind described) comprising a chest having a plurality of nozzles arranged to extend away from one or more walls of the chest with their inlet ends disposed within the chest. Air under pressure is applied to the chest and issues from the nozzles in substantially uniform streams.

It is also known to temper glass sheets differentially, that is to say to treat the glass sheet so that its temper varies from one zone of the sheet to another. For example, sheets intended for use as automobile windscreens are differentially tempered to form zones having little or no temper so that zones of adequate visibility are provided should the windscreen be broken.

Further, it is known to produce this differential tempering by varying the intensities of the streams of the cooling air impinging on the glass among other means.

It is an object of the present invention to provide an improved apparatus for differentially tempering glass sheets which may be readily constructed by modifying conventional blowing chests if desired.

According to the present invention an apparatus for differentially tempering glass sheets comprises a blowing chest of the kind described having its interior subdivided in-

to a main chamber and at least one sub-chamber each chamber having a proportion of the nozzle inlets opening thereinto and controllable means for permitting air to flow from the main chamber to each sub-chamber.

Preferably the air-flow controlling means is adjusted from outside the blowing chest and may be constituted by a register, hit-and-miss shutter or other valve means controlling one or more apertures or passages establishing communication between respective chambers.

The arrangement is such that when the aperture or apertures is or are completely unrestricted, the blowing air has free access to all the chambers and all the nozzles which are supplied by the chambers then supply air at the same intensity. On the other hand, by appropriately modifying the effective size of certain of the apertures, it is possible to reduce and even to shut off supply of air to a given sub-chamber and the nozzles supplied by it. Thus, without any manipulation other than the adjustment of the effective sizes of the apertures, it is possible to manufacture sheets that are differentially tempered to a greater or lesser degree.

Obviously it is possible to provide several sub-chambers distributed over the wall of the chest, the air-inlet apertures of which can be regulated separately or collectively. In this way, a corresponding number of zones having a different degree of tempering from the remainder of the glass sheet can be obtained.

The sub-chamber or sub-chambers may be movable and may be placed in appropriate position on the wall of the chest carrying the nozzles according to the type of glass sheet being manufactured.

Depending on the method of manufacture, it is possible to use either two chests according to the invention, disposed one on each

side of the glass sheet being tempered, or one such chest on one side only of the sheet, and a conventional chest on the other side of the sheet.

- 5 One embodiment of the apparatus according to the invention will now be described reference being made to the single figure of the accompanying drawing which is a vertical section of a blowing chest, the parts  
10 which are not necessary for understanding the invention being omitted.

For simplicity, only one blowing chest is shown.

- The figure shows a glass sheet 1 and a  
15 zone 2 thereof which is to receive a reduced amount of cooling air than the remainder of the sheet, or possibly none at all. A blowing chest 3 equipped with blowing nozzles 4 having inlets 4a is connected to an air pipe  
20 at 5.

- A sub-chamber 6 is disposed in the chest 3 facing the zone 2, this sub-chamber 6 enclosing the inlets 4a of a plurality of regularly distributed nozzles 4. A wall 6a, of the  
25 chamber 6 is formed with apertures 7. A plate 8 formed with orifices 9 is slidable in contact with the wall 6a by means of a rod 10 adjustable by means of a wing nut 11.

- By moving the plate 8, it is possible to  
30 regulate the quantity of blowing air issuing from the nozzles 4 covered by the chamber 6 between a zero value and a value corresponding to the air pressure in the remainder of the interior of the chest 3. Pressure gauges  
35 12 and 13 indicate the air pressures in the chamber 6 and the chest 3, respectively, and can be combined with means (not shown) which enable a required ratio to be maintained between the two pressures.

#### 40 WHAT WE CLAIM IS:—

1. An apparatus for differentially tempering glass sheets comprises a blowing chest of the kind described, having its interior subdivided into a main chamber  
45 and at least one sub-chamber each chamber

having a proportion of the nozzle inlets opening thereinto and controllable means for permitting air to flow from the main chamber to each sub-chamber.

2. An apparatus according to claim 1, 50 wherein the air-flow controlling means is constituted by a register, hit-and-miss shutter or other valve means controlling one or more apertures or passages establishing communication between respective chambers. 55

3. An apparatus according to claim 2, wherein the register or other valve means is moved by means of a rod extending through a wall of the chest, to be operated externally of the latter. 60

4. An apparatus according to any one of the preceding claims, wherein means is provided for measuring the air pressures in the main chamber and in the sub-chamber or chambers. 65

5. An apparatus according to claim 4, wherein automatic means is provided in combination with the measuring means for maintaining the desired ratio between the air pressures in the main chamber and the sub-chamber or chambers. 70

6. An apparatus for differentially tempering glass sheets substantially as herein described with reference to the accompanying drawing. 75

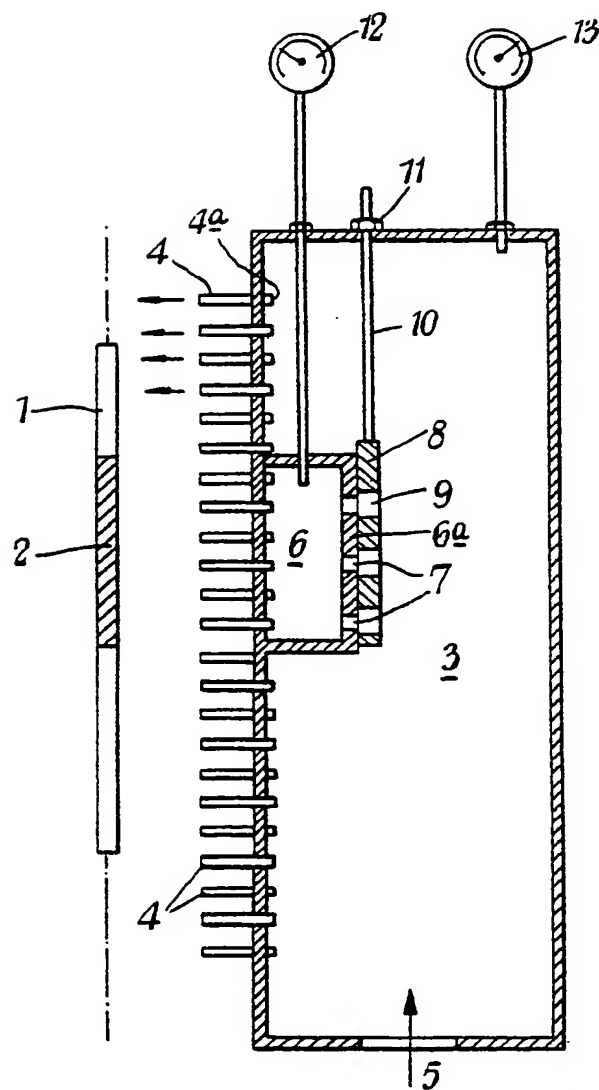
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# 806,999 COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.



# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

PUBLICATION NUMBER : 58088132  
PUBLICATION DATE : 26-05-83

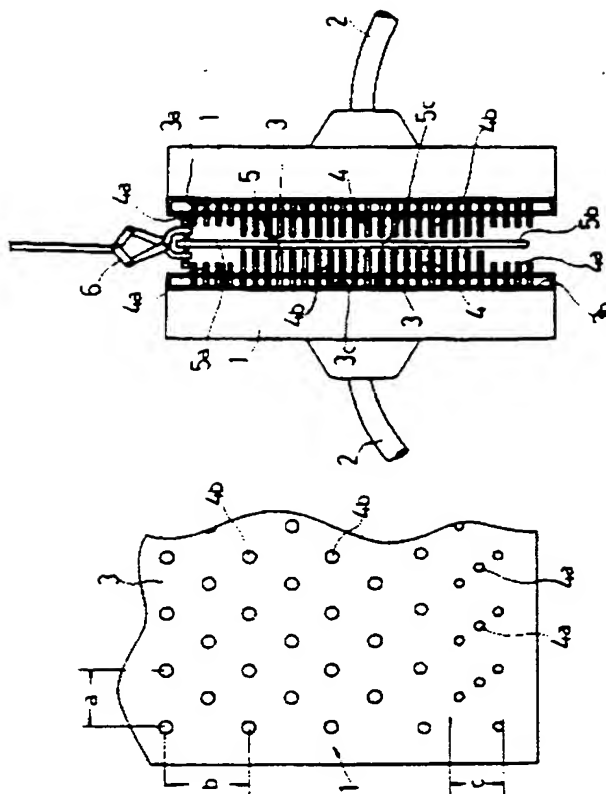
APPLICATION DATE : 18-11-81  
APPLICATION NUMBER : 56185992

APPLICANT : NIPPON SHEET GLASS CO LTD;

INVENTOR : YOSHIZAWA HIDEO;

INT.CL. : C03B 27/04

TITLE : METHOD AND APPARATUS FOR  
MANUFACTURE OF TEMPERED  
GLASS



ABSTRACT : PURPOSE: To manufacture tempered glass having low see-through distortion and high strength, by quenching the hot surface of a plate glass with quenching air blown through nozzles, wherein at least a part of the circumferential part of the plate glass is cooled uniformly compared with the central part thereof.

CONSTITUTION: A plate glass 5 is heated near its softening point, suspended with the clamp 6, and inserted between the oppositely placed nozzle groups 4. The surface of the glass is quenched by blasting air through the nozzles 4 while vertically oscillating the air supplying members 1, 1. Since the gap ND between the surfaces at the top 5a and the bottom 5b of the plate glass and the nozzles 4 is broader than the gap ND between the central part 5c of the plate glass and the nozzles 4b, the edge parts 5a, 5b of the plate glass is cooled more uniformly than the other part, and the possibility of the quenching crack caused by the tension exerting at the circumferential part of the plate glass 5 during quenching can be decreased.

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